



SEQUENCE LISTING

b1  
<110> Imamura, Toru

Asada, Masahiro

Oka, Syuichi

Suzuki, Masashi

Yoneda, Atsuko

Ota, Keiko

Oda, Yuko

Miyakawa, Kazuko

Orikasa, Noriko

Asada, Chie

Kojima, Tetsuhito

<120> HEPARIN-BINDING PROTEINS MODIFIED WITH SUGAR CHAINS,  
METHOD OF PRODUCING THE SAME AND PHARMACEUTICAL  
COMPOSITIONS CONTAINING THE SAME

<130> 382.1019

<140> 09/121,017

<141> 1998-07-22

<150> 307721/1997

<151> 1997-11-10

<160> 31

<170> PatentIn Ver. 2.0

<210> 1

<211> 221

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: fusion of

sequence for a part of human rydolan and a part of human fibroblast

growth factor 1

<400> 1

Met Ala Pro Ala Arg Leu Phe Ala Leu Leu Leu Phe Phe Val Gly Gly

1 5 10 15

Val Ala Glu Ser Ile Arg Glu Thr Glu Val Ile Asp Pro Gln Asp Leu

20 25 30

Leu Glu Gly Arg Tyr Phe Ser Gly Ala Leu Pro Asp Asp Glu Asp Val

35 40 45

Val Gly Pro Gly Gln Glu Ser Asp Asp Phe Glu Leu Ser Gly Ser Gly

50 55 60

Asp Leu Asp Asp Leu Glu Asp Ser Met Ile Gly Pro Glu Val Val His

65 70 75 80

Pro Leu Val Pro Leu Asp Ala Asn Tyr Lys Lys Pro Lys Leu Leu Tyr

85

*Start of human fibroblast growth factor*

90

95

Cys Ser Asn Gly Gly His Phe Leu Arg Ile Leu Pro Asp Gly Thr Val

100

105

110

Asp Gly Thr Arg Asp Arg Ser Asp Gln His Ile Gln Leu Gln Leu Ser  
115 120 125

Ala Glu Ser Val Gly Glu Val Tyr Ile Lys Ser Thr Glu Thr Gly Gln  
130 135 140

Tyr Leu Ala Met Asp Thr Asp Gly Leu Leu Tyr Gly Ser Gln Thr Pro  
145 150 155 160

Asn Glu Glu Cys Leu Phe Leu Glu Arg Leu Glu Glu Asn His Tyr Asn  
165 170 175

Thr Tyr Ile Ser Lys Lys His Ala Glu Lys Asn Trp Phe Val Gly Leu  
180 185 190

Lys Lys Asn Gly Ser Cys Lys Arg Gly Pro Arg Thr His Tyr Gly Gln  
195 200 205

Lys Ala Ile Leu Phe Leu Pro Leu Pro Val Ser Ser Asp  
210 215 220

<210> 2

<211> 663

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: fusion of

sequence for a part of human rydocan and a part of human fibroblast

growth factor 1

<220>

<221> CDS

<222> (1)..(663)

<400> 2

atg gcc ccc gcc cgt ctg ttc gcg ctg ctg ctg ttc ttc gta ggc gga 48

Met Ala Pro Ala Arg Leu Phe Ala Leu Leu Leu Phe Phe Val Gly Gly

1 5 10 15

gtc gcc gag tcg atc cga gag act gag gtc atc gac ccc cag gac ctc 96

Val Ala Glu Ser Ile Arg Glu Thr Glu Val Ile Asp Pro Gln Asp Leu

20 25 30

cta gaa ggc cga tac ttc tcc gga gcc cta cca gac gat gag gat gta 144

Leu Glu Gly Arg Tyr Phe Ser Gly Ala Leu Pro Asp Asp Glu Asp Val

35 40 45

gtg ggg ccc ggg cag gaa tct gat gac ttt gag ctg tct ggc tct gga 192

Val Gly Pro Gly Gln Glu Ser Asp Asp Phe Glu Leu Ser Gly Ser Gly

50 55 60

gat ctg gat gac ttg gaa gac tcc atg atc ggc cct gaa gtt gtc cat 240

Asp Leu Asp Asp Leu Glu Asp Ser Met Ile Gly Pro Glu Val Val His

65 70 75 80

ccc ttg gtg cct cta gat gct aat tac aag aag ccc aaa ctc ctc tac 288

Pro Leu Val Pro Leu Asp Ala Asn Tyr Lys Lys Pro Lys Leu Leu Tyr

85	90	95	
tgt agc aac ggg ggc cac ttc ctg agg atc ctt ccg gat ggc aca gtg			336
Cys Ser Asn Gly Gly His Phe Leu Arg Ile Leu Pro Asp Gly Thr Val			
100	105	110	
gat ggg aca agg gac agg agc gac cag cac att cag ctg cag ctc agt			384
Asp Gly Thr Arg Asp Arg Ser Asp Gln His Ile Gln Leu Gln Leu Ser			
115	120	125	
gcg gaa agc gtg ggg gag gtg tat ata aag agt acc gag act ggc cag			432
Ala Glu Ser Val Gly Glu Val Tyr Ile Lys Ser Thr Glu Thr Gly Gln			
130	135	140	
tac ttg gcc atg gac acc gac ggg ctt tta tac ggc tca cag aca cca			480
Tyr Leu Ala Met Asp Thr Asp Gly Leu Leu Tyr Gly Ser Gln Thr Pro			
145	150	155	160
aat gag gaa tgt ttg ttc ctg gaa agg ctg gag gag aac cat tac aac			528
Asn Glu Glu Cys Leu Phe Leu Glu Arg Leu Glu Glu Asn His Tyr Asn			
165	170	175	
acc tat ata tcc aag aag cat gca gag aag aat tgg ttt gtt ggc ctc			576
Thr Tyr Ile Ser Lys Lys His Ala Glu Lys Asn Trp Phe Val Gly Leu			
180	185	190	
aag aag aat ggg agc tgc aaa cgc ggt cct cgg act cac tat ggc cag			624
Lys Lys Asn Gly Ser Cys Lys Arg Gly Pro Arg Thr His Tyr Gly Gln			
195	200	205	
aaa gca atc ttg ttt ctc ccc ctg cca gtc tct tct gat			663

Lys Ala Ile Leu Phe Leu Pro Leu Pro Val Ser Ser Asp

210

215

220

<210> 3

<211> 175

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: fusion of

sequence for a part of mouse fibroblast growth factor 6 and

a part of human fibroblast growth factor 1

<400> 3

Met Ser Arg Gly Ala Gly Arg Val Gln Gly Thr Leu Gln Ala Leu Val

1

5

10

15

Phe Leu Gly Val Leu Val Gly Met Val Val Pro Ser Pro Ala Gly Ala

20

25

30

Arg Ala Asn Gly Thr Leu Leu Asp Ala Asn Tyr Lys Lys Pro Lys Leu.

35

*Start<sup>40</sup> of human fibroblast growth factor<sup>45</sup>*

Leu Tyr Cys Ser Asn Gly Gly His Phe Leu Arg Ile Leu Pro Asp Gly

50

55

60

Thr Val Asp Gly Thr Arg Asp Arg Ser Asp Gln His Ile Gln Leu Gln

65

70

75

80

Leu Ser Ala Glu Ser Val Gly Glu Val Tyr Ile Lys Ser Thr Glu Thr

85

90

95

Gly Gln Tyr Leu Ala Met Asp Thr Asp Gly Leu Leu Tyr Gly Ser Gln

100

105

110

Thr Pro Asn Glu Glu Cys Leu Phe Leu Glu Arg Leu Glu Glu Asn His

115

120

125

Tyr Asn Thr Tyr Ile Ser Lys Lys His Ala Glu Lys Asn Trp Phe Val

130

135

140

Gly Leu Lys Lys Asn Gly Ser Cys Lys Arg Gly Pro Arg Thr His Tyr

145

150

155

160

Gly Gln Lys Ala Ile Leu Phe Leu Pro Leu Pro Val Ser Ser Asp

165

170

175

<210> 4

<211> 525

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: fusion of  
sequence for a part of mouse fibroblast growth factor 6 and  
a part of human fibroblast growth factor 1

<220>

<221> CDS

<222> (1)..(525)

*end of human  
fibroblast  
growth  
factor 1*

<400> 4

atg tcc cgg gga gca gga cgt gtt cag ggc acg ctg cag gct ctc gtc 48

Met Ser Arg Gly Ala Gly Arg Val Gln Gly Thr Leu Gln Ala Leu Val

1 5 10 15

ttc tta ggc gtc cta gtg ggc atg gtg gtg ccc tca ~~cct~~ gcc ggc gcc 96

Phe Leu Gly Val Leu Val Gly Met Val Val Pro Ser Pro Ala Gly Ala

20 25 30

cgc gcc aac ggc acg cta ctg gac gct aat tac aag aag ccc aaa ctc 144

Arg Ala Asn Gly Thr Leu Leu Asp Ala Asn Tyr Lys Lys Pro Lys Leu

35 40 45

ctc tac tgt agc aac ggg ggc cac ttc ctg agg atc ctt ccg gat ggc 192

Leu Tyr Cys Ser Asn Gly Gly His Phe Leu Arg Ile Leu Pro Asp Gly

50 55 60

aca gtg gat ggg aca agg gac agg agc gac cag cac att cag ctg cag 240

Thr Val Asp Gly Thr Arg Asp Arg Ser Asp Gln His Ile Gln Leu Gln

65 70 75 80

ctc agt gcg gaa agc gtg ggg gag gtg tat ata aag agt acc gag act 288

Leu Ser Ala Glu Ser Val Gly Glu Val Tyr Ile Lys Ser Thr Glu Thr

85 90 95

ggc cag tac ttg gcc atg gac acc gac ggg ctt tta tac ggc tca cag 336

Gly Gln Tyr Leu Ala Met Asp Thr Asp Gly Leu Leu Tyr Gly Ser Gln

100 105 110

aca cca aat gag gaa tgt ttg ttc ctg gaa agg ctg gag gag aac cat 384  
 Thr Pro Asn Glu Glu Cys Leu Phe Leu Glu Arg Leu Glu Glu Asn His  
 115 120 125

tac aac acc tat ata tcc aag aag cat gca gag aag aat tgg ttt gtt 432  
 Tyr Asn Thr Tyr Ile Ser Lys Lys His Ala Glu Lys Asn Trp Phe Val  
 130 135 140

ggc ctc aag aag aat ggg agc tgc aaa cgc ggt cct cgg act cac tat 480  
 Gly Leu Lys Lys Asn Gly Ser Cys Lys Arg Gly Pro Arg Thr His Tyr  
 145 150 155 160

ggc cag aaa gca atc ttg ttt ctc ccc ctg cca gtc tct tct gat 525  
 Gly Gln Lys Ala Ile Leu Phe Leu Pro Leu Pro Val Ser Ser Asp  
 165 170 175

<210> 5

<211> 181

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: fusion of  
 sequence for a part of mouse fibroblast growth factor 6,  
 a part of human fibroblast growth factor 1 and an artificial  
 sequence

<400> 5

Met Ser Arg Gly Ala Gly Arg Val Gln Gly Thr Leu Gln Ala Leu Val

1	5	10	15
Phe	Leu	Gly	Val
Leu	Val	Gly	Met
Val	Val	Pro	Ser
Pro	Ala	Gly	Ala
20	25	30	
Arg	Ala	Gln	Gly
Thr	Leu	Leu	Asp
Ala	Asn	Tyr	Lys
Lys	Lys	Pro	Lys
Leu			
35	40	45	
Leu	Tyr	Cys	Ser
Asn	Gly	Gly	His
Phe	Leu	Arg	Ile
Leu	Pro	Asp	Gly
50	55	60	
Thr	Val	Asp	Gly
Thr	Arg	Asp	Arg
Ser	Asp	Gln	His
Ile	Gln	Leu	Gln
65	70	75	80
Leu	Ser	Ala	Glu
Ser	Val	Gly	Glu
Val	Tyr	Ile	Lys
Ser	Thr	Glu	Thr
85	90	95	
Gly	Gln	Tyr	Leu
Ala	Met	Asp	Thr
Asp	Gly	Leu	Leu
Tyr	Gly	Ser	Gln
100	105	110	
Thr	Pro	Asn	Glu
Glu	Cys	Leu	Phe
Leu	Glu	Arg	Leu
Glu	Glu	Ala	Ala
115	120	125	
Thr	Pro	Ala	Pro
Asn	His	Tyr	Asn
Thr	Tyr	Ile	Ser
Lys	Lys	His	Ala
130	135	140	
Glu	Lys	Asn	Trp
Phe	Val	Gly	Leu
Lys	Lys	Asn	Gly
Ser	Cys	Lys	Arg
145	150	155	160
Gly	Pro	Arg	Thr
His	Tyr	Gly	Gln
Lys	Ala	Ile	Leu
Phe	Leu	Pro	Leu

*start of human fibroblast growth factor 1*

*inserted  
artificial  
sequence*

165

170

175

Pro Val Ser Ser Asp

180

&lt;210&gt; 6

&lt;211&gt; 543

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence: fusion of

sequence for a part of mouse fibroblast growth factor 6,

a part of human fibroblast growth factor 1 and an artificial

sequence

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(543)

&lt;400&gt; 6

atg tcc cgg gga gca gga cgt gtt cag ggc acg ctg cag gct ctc gtc 48

Met Ser Arg Gly Ala Gly Arg Val Gln Gly Thr Leu Gln Ala Leu Val

1

5

10

15

ttc tta ggc gtc cta gtg ggc atg gtg gtg ccc tca cct gcc ggc gcc 96

Phe Leu Gly Val Leu Val Gly Met Val Val Pro Ser Pro Ala Gly Ala

20

25

30

cgc gcc caa ggc acg cta ctg gac gct aat tac aag aag ccc aaa ctc 144

Arg	Ala	Gln	Gly	Thr	Leu	Leu	Asp	Ala	Asn	Tyr	Lys	Lys	Pro	Lys	Leu	
		35					40					45				
ctc	tac	tgt	agc	aac	ggg	ggc	cac	ttc	ctg	agg	atc	ctt	ccg	gat	ggc	192
Leu	Tyr	Cys	Ser	Asn	Gly	Gly	His	Phe	Leu	Arg	Ile	Leu	Pro	Asp	Gly	
		50					55					60				
aca	gtg	gat	ggg	aca	agg	gac	agg	agc	gac	cag	cac	att	cag	ctg	cag	240
Thr	Val	Asp	Gly	Thr	Arg	Asp	Arg	Ser	Asp	Gln	His	Ile	Gln	Leu	Gln	
		65					70					75			80	
ctc	agt	gcg	gaa	agc	gtg	ggg	gag	gtg	tat	ata	aag	agt	acc	gag	act	288
Leu	Ser	Ala	Glu	Ser	Val	Gly	Glu	Val	Tyr	Ile	Lys	Ser	Thr	Glu	Thr	
							85				90				95	
ggc	cag	tac	ttg	gcc	atg	gac	acc	gac	ggg	ctt	tta	tac	ggc	tca	cag	336
Gly	Gln	Tyr	Leu	Ala	Met	Asp	Thr	Asp	Gly	Leu	Leu	Tyr	Gly	Ser	Gln	
							100				105				110	
aca	cca	aat	gag	gaa	tgt	ttg	ttc	ctg	gaa	agg	ctg	gag	gag	gct	gct	384
Thr	Pro	Asn	Glu	Glu	Cys	Leu	Phe	Leu	Glu	Arg	Leu	Glu	Glu	Ala	Ala	
							115				120				125	
act	cca	gct	cca	aac	cat	tac	aac	acc	tat	ata	tcc	aag	aag	cat	gca	432
Thr	Pro	Ala	Pro	Asn	His	Tyr	Asn	Thr	Tyr	Ile	Ser	Lys	Lys	His	Ala	
							130				135				140	
gag	aag	aat	tgg	ttt	gtt	ggc	ctc	aag	aag	aat	ggg	agc	tgc	aaa	cgc	480
Glu	Lys	Asn	Trp	Phe	Val	Gly	Leu	Lys	Lys	Asn	Gly	Ser	Cys	Lys	Arg	
							145				150				155	160

ggt cct cgg act cac tat ggc cag aaa gca atc ttg ttt ctc ccc ctg 528

Gly Pro Arg Thr His Tyr Gly Gln Lys Ala Ile Leu Phe Leu Pro Leu

165

170

175

cca gtc tct tct gat

543

Pro Val Ser Ser Asp

180

<210> 7

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:primer for PCR

<400> 7

ttgtcgaccc accatggccc ccgcccgtct

30

<210> 8

<211> 26

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:primer for PCR

<400> 8

ttgatatcta gaggcaccaa gggatg

26

<210> 9

<211> 35

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:primer for PCR

<400> 9

gcgtcgacag cgctaattac aagaagccca aactc

35

<210> 10

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:primer for PCR

<400> 10

ccgaattcga attctttaat cagaagagac tgg

33

<210> 11

<211> 64

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:primer for PCR

<400> 11

gcgtcgaccc accatgtccc ggggagcagg acgtgttcag ggcacgctgc aggctctcgt 60

cttc

64

<210> 12

<211> 29

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:primer for PCR

<400> 12

gcgatatcca gtagcgtgcc gttggcgcg

29

<210> 13

<211> 18

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:primer for PCR

<400> 13

gcgtcgaccc accatgtc

18

<210> 14

<211> 29

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:primer for PCR

<400> 14

gcgatatcca gtagcgtgcc ttgggcgcg

29

<210> 15

<211> 38

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:primer for PCR

<400> 15

gctggaggag gctgctactc cagctccaaa ccattaca

38

<210> 16

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer for PCR

<400> 16

gccgctctag aactagtga t

21

<210> 17

<211> 200

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: fusion of

sequence for a part of human ryudocan and a part of human  
fibroblast

growth factor 1

<400> 17

Met Ala Pro Ala Arg Leu Phe Ala Leu Leu Leu Phe Phe Val Gly Gly

1

5

10

15

Val Ala Glu Ser Ile Arg Glu Thr Glu Val Ile Asp Pro Gln Asp Leu

20

25

30

Leu Glu Gly Arg Tyr Phe Ser Gly Ala Leu Pro Asp Asp Glu Asp Val

35

40

45

Val Gly Pro Gly Gln Glu Ser Asp Asp Phe Glu Leu Ser Gly Ser Gly

50

55

60

Asp Ala Asn Tyr Lys Lys Pro Lys Leu Leu Tyr Cys Ser Asn Gly Gly

65

70

75

80

*start of FGF1*

His Phe Leu Arg Ile Leu Pro Asp Gly Thr Val Asp Gly Thr Arg Asp

85

90

95

Arg Ser Asp Gln His Ile Gln Leu Gln Leu Ser Ala Glu Ser Val Gly

100

105

110

Glu Val Tyr Ile Lys Ser Thr Glu Thr Gly Gln Tyr Leu Ala Met Asp

115

120

125

Thr Asp Gly Leu Leu Tyr Gly Ser Gln Thr Pro Asn Glu Glu Cys Leu

130

135

140

Phe Leu Glu Arg Leu Glu Glu Asn His Tyr Asn Thr Tyr Ile Ser Lys

145

150

155

160

Lys His Ala Glu Lys Asn Trp Phe Val Gly Leu Lys Lys Asn Gly Ser

165

170

175

Cys Lys Arg Gly Pro Arg Thr His Tyr Gly Gln Lys Ala Ile Leu Phe

180

185

190

Leu Pro Leu Pro Val Ser Ser Asp

195

200

<210> 18

<211> 600

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: fusion of

sequence for a part of human ryudocan and a part of human  
fibroblast

growth factor 1

<220>

<221> CDS

<222> (1)..(600)

<400> 18

atg gcc ccc gcc cgt ctg ttc gcg ctg ctg ctg ttc ttc gta ggc gga 48

Met Ala Pro Ala Arg Leu Phe Ala Leu Leu Leu Phe Phe Val Gly Gly

1 5 10 15

gtc gcc gag tcg atc cga gag act gag gtc atc gac ccc cag gac ctc 96

Val Ala Glu Ser Ile Arg Glu Thr Glu Val Ile Asp Pro Gln Asp Leu

20 25 30

cta gaa ggc cga tac ttc tcc gga gcc cta cca gac gat gag gat gta 144

Leu Glu Gly Arg Tyr Phe Ser Gly Ala Leu Pro Asp Asp Glu Asp Val

35 40 45

gtg ggg ccc ggg cag gaa tct gat gac ttt gag ctg tct ggc tct gga 192

Val Gly Pro Gly Gln Glu Ser Asp Asp Phe Glu Leu Ser Gly Ser Gly

50 55 60



Cys Lys Arg Gly Pro Arg Thr His Tyr Gly Gln Lys Ala Ile Leu Phe

180

185

190

ctc ccc ctg cca gtc tct tct gat

600

Leu Pro Leu Pro Val Ser Ser Asp

195

200

<210> 19

<211> 200

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: fusion of  
sequence for a part of human ryudocan mutant and a part of human  
fibroblast growth factor 1

<400> 19

Met Ala Pro Ala Arg Leu Phe Ala Leu Leu Leu Phe Phe Val Gly Gly

1

5

10

15

Val Ala Glu Ser Ile Arg Glu Thr Glu Val Ile Asp Pro Gln Asp Leu

20

25

30

Leu Glu Gly Arg Tyr Phe Ser Gly Ala Leu Ser Asp Asp Glu Asp Val

35

40

45

Val Gly Pro Gly Gln Glu Ser Asp Asp Phe Glu Leu Ser Gly Ser Gly

50

55

60

Asp Ala Asn Tyr Lys Lys Pro Lys Leu Leu Tyr Cys Ser Asn Gly Gly  
65 70 75 80

His Phe Leu Arg Ile Leu Pro Asp Gly Thr Val Asp Gly Thr Arg Asp  
85 90 95

Arg Ser Asp Gln His Ile Gln Leu Gln Leu Ser Ala Glu Ser Val Gly  
100 105 110

Glu Val Tyr Ile Lys Ser Thr Glu Thr Gly Gln Tyr Leu Ala Met Asp  
115 120 125

Thr Asp Gly Leu Leu Tyr Gly Ser Gln Thr Pro Asn Glu Glu Cys Leu  
130 135 140

Phe Leu Glu Arg Leu Glu Glu Asn His Tyr Asn Thr Tyr Ile Ser Lys  
145 150 155 160

Lys His Ala Glu Lys Asn Trp Phe Val Gly Leu Lys Lys Asn Gly Ser  
165 170 175

Cys Lys Arg Gly Pro Arg Thr His Tyr Gly Gln Lys Ala Ile Leu Phe  
180 185 190

Leu Pro Leu Pro Val Ser Ser Asp  
195 200

<210> 20

<211> 600

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: fusion of  
sequence for a part of human ryudocan mutant and a part of human  
fibroblast growth factor 1

<220>

<221> CDS

<222> (1)..(600)

<400> 20

atg gcc ccc gcc cgt ctg ttc gcg ctg ctg ctg ttc ttc gta ggc gga 48

Met Ala Pro Ala Arg Leu Phe Ala Leu Leu Leu Phe Phe Val Gly Gly

1 5 10 15

gtc gcc gag tcg atc cga gag act gag gtc atc gac ccc cag gac ctc 96

Val Ala Glu Ser Ile Arg Glu Thr Glu Val Ile Asp Pro Gln Asp Leu

20 25 30

cta gaa ggc cga tac ttc tcc gga gcc cta tca gac gat gag gat gta 144

Leu Glu Gly Arg Tyr Phe Ser Gly Ala Leu Ser Asp Asp Glu Asp Val

35 40 45

gtg ggg ccc ggg cag gaa tct gat gac ttt gag ctg tct ggc tct gga 192

Val Gly Pro Gly Gln Glu Ser Asp Asp Phe Glu Leu Ser Gly Ser Gly

50 55 60

gat gct aat tac aag aag ccc aaa ctc ctc tac tgt agc aac ggg ggc 240

Asp Ala Asn Tyr Lys Lys Pro Lys Leu Leu Tyr Cys Ser Asn Gly Gly

65	70	75	80	
cac ttc ctg agg atc ctt ccg gat ggc aca gtg gat ggg aca agg gac				288
His Phe Leu Arg Ile Leu Pro Asp Gly Thr Val Asp Gly Thr Arg Asp				
	85	90	95	
agg agc gac cag cac att cag ctg cag ctc agt gcg gaa agc gtg ggg				336
Arg Ser Asp Gln His Ile Gln Leu Gln Leu Ser Ala Glu Ser Val Gly				
	100	105	110	
gag gtg tat ata aag agt acc gag act ggc cag tac ttg gcc atg gac				384
Glu Val Tyr Ile Lys Ser Thr Glu Thr Gly Gln Tyr Leu Ala Met Asp				
	115	120	125	
acc gac ggg ctt tta tac ggc tca cag aca cca aat gag gaa tgt ttg				432
Thr Asp Gly Leu Leu Tyr Gly Ser Gln Thr Pro Asn Glu Glu Cys Leu				
	130	135	140	
ttc ctg gaa agg ctg gag gag aac cat tac aac acc tat ata tcc aag				480
Phe Leu Glu Arg Leu Glu Glu Asn His Tyr Asn Thr Tyr Ile Ser Lys				
	145	150	155	160
aag cat gca gag aag aat tgg ttt gtt ggc ctc aag aag aat ggg agc				528
Lys His Ala Glu Lys Asn Trp Phe Val Gly Leu Lys Lys Asn Gly Ser				
	165	170	175	
tgc aaa cgc ggt cct cgg act cac tat ggc cag aaa gca atc ttg ttt				576
Cys Lys Arg Gly Pro Arg Thr His Tyr Gly Gln Lys Ala Ile Leu Phe				
	180	185	190	

ctc ccc ctg cca gtc tct tct gat

600

Leu Pro Leu Pro Val Ser Ser Asp

195

200

<210> 21

<211> 254

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: fusion of

sequence for a part of human ryudocan and a part of human  
fibroblast

growth factor 1

<400> 21

Met Ala Pro Ala Arg Leu Phe Ala Leu Leu Leu Phe Phe Val Gly Gly

1

5

10

15

Val Ala Glu Ser Ile Arg Glu Thr Glu Val Ile Asp Pro Gln Asp Leu

20

25

30

Leu Glu Gly Arg Tyr Phe Ser Gly Ala Leu Pro Asp Asp Glu Asp Val

35

40

45

Val Gly Pro Gly Gln Glu Ser Asp Asp Phe Glu Leu Ser Gly Ser Gly

50

55

60

Asp Leu Asp Asp Leu Glu Asp Ser Met Ile Gly Pro Glu Val Val His

52

65		70		75		80									
Pro	Leu	Val	Pro	Leu	Asp	Asn	His	Ile	Pro	Glu	Arg	Ala	Gly	Ser	Gly
			85						90					95	
Ser	Gln	Val	Pro	Thr	Glu	Pro	Lys	Lys	Leu	Glu	Glu	Asn	Glu	Val	Ile
		100						105					110		
Pro	Lys	Arg	Ile	Ser	Pro	Val	Ala	Asn	Tyr	Lys	Lys	Pro	Lys	Leu	Leu
	115					120								125	
<i>start of FGF1</i>															
Tyr	Cys	Ser	Asn	Gly	Gly	His	Phe	Leu	Arg	Ile	Leu	Pro	Asp	Gly	Thr
	130					135					140				
Val	Asp	Gly	Thr	Arg	Asp	Arg	Ser	Asp	Gln	His	Ile	Gln	Leu	Gln	Leu
145					150					155				160	
Ser	Ala	Glu	Ser	Val	Gly	Glu	Val	Tyr	Ile	Lys	Ser	Thr	Glu	Thr	Gly
			165						170					175	
Gln	Tyr	Leu	Ala	Met	Asp	Thr	Asp	Gly	Leu	Leu	Tyr	Gly	Ser	Gln	Thr
		180						185					190		
Pro	Asn	Glu	Glu	Cys	Leu	Phe	Leu	Glu	Arg	Leu	Glu	Glu	Asn	His	Tyr
	195					200							205		
Asn	Thr	Tyr	Ile	Ser	Lys	Lys	His	Ala	Glu	Lys	Asn	Trp	Phe	Val	Gly
	210					215					220				
Leu	Lys	Lys	Asn	Gly	Ser	Cys	Lys	Arg	Gly	Pro	Arg	Thr	His	Tyr	Gly
225					230					235				240	

Gln Lys Ala Ile Leu Phe Leu Pro Leu Pro Val Ser Ser Asp

245

250

<210> 22

<211> 762

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: fusion of

sequence for a part of human ryudocan and a part of human  
fibroblast

growth factor 1

<220>

<221> CDS

<222> (1)..(762)

<400> 22

atg gcc ccc gcc cgt ctg ttc gcg ctg ctg ctg ttc ttc gta ggc gga 48

Met Ala Pro Ala Arg Leu Phe Ala Leu Leu Leu Phe Phe Val Gly Gly

1

5

10

15

gtc gcc gag tcg atc cga gag act gag gtc atc gac ccc cag gac ctc 96

Val Ala Glu Ser Ile Arg Glu Thr Glu Val Ile Asp Pro Gln Asp Leu

20

25

30

cta gaa ggc cga tac ttc tcc gga gcc cta cca gac gat gag gat gta 144

Leu Glu Gly Arg Tyr Phe Ser Gly Ala Leu Pro Asp Asp Glu Asp Val

54

35	40	45	
gtg ggg ccc ggg cag gaa tct gat gac ttt gag ctg tct ggc tct gga Val Gly Pro Gly Gln Glu Ser Asp Asp Phe Glu Leu Ser Gly Ser Gly			192
50	55	60	
gat ctg gat gac ttg gaa gac tcc atg atc ggc cct gaa gtt gtc cat Asp Leu Asp Asp Leu Glu Asp Ser Met Ile Gly Pro Glu Val Val His			240
65	70	75	80
ccc ttg gtg cct cta gat aac cat atc cct gag agg gca ggg tct ggg Pro Leu Val Pro Leu Asp Asn His Ile Pro Glu Arg Ala Gly Ser Gly			288
	85	90	95
agc caa gtc ccc acc gaa ccc aag aaa cta gag gag aat gag gtt atc Ser Gln Val Pro Thr Glu Pro Lys Lys Leu Glu Glu Asn Glu Val Ile			336
	100	105	110
ccc aag aga atc tca ccc gtt gct aat tac aag aag ccc aaa ctc ctc Pro Lys Arg Ile Ser Pro Val Ala Asn Tyr Lys Lys Pro Lys Leu Leu			384
	115	120	125
tac tgt agc aac ggg ggc cac ttc ctg agg atc ctt ccg gat ggc aca Tyr Cys Ser Asn Gly Gly His Phe Leu Arg Ile Leu Pro Asp Gly Thr			432
	130	135	140
gtg gat ggg aca agg gac agg agc gac cag cac att cag ctg cag ctc Val Asp Gly Thr Arg Asp Arg Ser Asp Gln His Ile Gln Leu Gln Leu			480
145	150	155	160

agc ggc gaa agc gtg ggg gag gtg tat ata aag agt acc gag act ggc 528  
 Ser Ala Glu Ser Val Gly Glu Val Tyr Ile Lys Ser Thr Glu Thr Gly  
 165 170 175

cag tac ttg gcc atg gac acc gac ggg ctt tta tac ggc tca cag aca 576  
 Gln Tyr Leu Ala Met Asp Thr Asp Gly Leu Leu Tyr Gly Ser Gln Thr  
 180 185 190

cca aat gag gaa tgt ttg ttc ctg gaa agg ctg gag gag aac cat tac 624  
 Pro Asn Glu Glu Cys Leu Phe Leu Glu Arg Leu Glu Glu Asn His Tyr  
 195 200 205

aac acc tat ata tcc aag aag cat gca gag aag aat tgg ttt gtt ggc 672  
 Asn Thr Tyr Ile Ser Lys Lys His Ala Glu Lys Asn Trp Phe Val Gly  
 210 215 220

ctc aag aag aat ggg agc tgc aaa cgc ggt cct cgg act cac tat ggc 720  
 Leu Lys Lys Asn Gly Ser Cys Lys Arg Gly Pro Arg Thr His Tyr Gly  
 225 230 235 240

cag aaa gca atc ttg ttt ctc ccc ctg cca gtc tct tct gat 762  
 Gln Lys Ala Ile Leu Phe Leu Pro Leu Pro Val Ser Ser Asp  
 245 250

<210> 23

<211> 281

<212> PRT

<213> Artificial Sequence

<223> Description of Artificial Sequence: fusion of

sequence for a part of human ryudocan and a part of human fibroblast

growth factor 1

<400> 23

Met Ala Pro Ala Arg Leu Phe Ala Leu Leu Leu Phe Phe Val Gly Gly  
1 5 10 15

Val Ala Glu Ser Ile Arg Glu Thr Glu Val Ile Asp Pro Gln Asp Leu  
20 25 30

Leu Glu Gly Arg Tyr Phe Ser Gly Ala Leu Pro Asp Asp Glu Asp Val  
35 40 45

Val Gly Pro Gly Gln Glu Ser Asp Asp Phe Glu Leu Ser Gly Ser Gly  
50 55 60

Asp Leu Asp Asp Leu Glu Asp Ser Met Ile Gly Pro Glu Val Val His  
65 70 75 80

Pro Leu Val Pro Leu Asp Asn His Ile Pro Glu Arg Ala Gly Ser Gly  
85 90 95

Ser Gln Val Pro Thr Glu Pro Lys Lys Leu Glu Glu Asn Glu Val Ile  
100 105 110

Pro Lys Arg Ile Ser Pro Val Glu Glu Ser Glu Asp Val Ser Asn Lys  
115 120 125

Val Ser Met Ser Ser Thr Val Gln Gly Ser Asn Ile Phe Glu Arg Thr  
130 135 140

human  
 human  
 HGF-1

Glu Val Ala Asn Tyr Lys Lys Pro Lys Leu Leu Tyr Cys Ser Asn Gly  
 145 150 155 160

Gly His Phe Leu Arg Ile Leu Pro Asp Gly Thr Val Asp Gly Thr Arg  
 165 170 175

Asp Arg Ser Asp Gln His Ile Gln Leu Gln Leu Ser Ala Glu Ser Val  
 180 185 190

Gly Glu Val Tyr Ile Lys Ser Thr Glu Thr Gly Gln Tyr Leu Ala Met  
 195 200 205

Asp Thr Asp Gly Leu Leu Tyr Gly Ser Gln Thr Pro Asn Glu Glu Cys  
 210 215 220

Leu Phe Leu Glu Arg Leu Glu Glu Asn His Tyr Asn Thr Tyr Ile Ser  
 225 230 235 240

Lys Lys His Ala Glu Lys Asn Trp Phe Val Gly Leu Lys Lys Asn Gly  
 245 250 255

Ser Cys Lys Arg Gly Pro Arg Thr His Tyr Gly Gln Lys Ala Ile Leu  
 260 265 270

Phe Leu Pro Leu Pro Val Ser Ser Asp  
 275 280

<210> 24

<211> 843

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: fusion of

sequence for a part of human ryudocan and a part of human fibroblast

growth factor 1

<220>

<221> CDS

<222> (1)..(843)

<400> 24

atg gcc ccc gcc cgt ctg ttc gcg ctg ctg ctg ttc ttc gta ggc gga 48

Met Ala Pro Ala Arg Leu Phe Ala Leu Leu Leu Phe Phe Val Gly Gly

1 5 10 15

gtc gcc gag tcg atc cga gag act gag gtc atc gac ccc cag gac ctc 96

Val Ala Glu Ser Ile Arg Glu Thr Glu Val Ile Asp Pro Gln Asp Leu

20 25 30

cta gaa ggc cga tac ttc tcc gga gcc cta cca gac gat gag gat gta 144

Leu Glu Gly Arg Tyr Phe Ser Gly Ala Leu Pro Asp Asp Glu Asp Val

35 40 45

gtg ggg ccc ggg cag gaa tct gat gac ttt gag ctg tct ggc tct gga 192

Val Gly Pro Gly Gln Glu Ser Asp Asp Phe Glu Leu Ser Gly Ser Gly

50 55 60

gat	ctg	gat	gac	ttg	gaa	gac	tcc	atg	atc	ggc	cct	gaa	gtt	gtc	cat	240
Asp	Leu	Asp	Asp	Leu	Glu	Asp	Ser	Met	Ile	Gly	Pro	Glu	Val	Val	His	
65					70					75					80	

agc caa gtc ccc acc gaa ccc aag aaa cta gag gag aat gag gtt atc 336  
Ser Gln Val Pro Thr Glu Pro Lys Lys Leu Glu Glu Asn Glu Val Ile  
100 105 110

gtg tca atg tcc agc act gtg cag ggc agc aac atc ttt gag aga acg 432  
Val Ser Met Ser Ser Thr Val Gln Gly Ser Asn Ile Phe Glu Arg Thr  
130 135 140

ggc cac ttc ctg agg atc ctt ccg gat ggc aca gtg gat ggg aca agg 528  
Gly His Phe Leu Arg Ile Leu Pro Asp Gly Thr Val Asp Gly Thr Arg  
165 170 175

60

ggg gag gtg tat ata aag agt acc gag act ggc cag tac ttg gcc atg 624  
 Gly Glu Val Tyr Ile Lys Ser Thr Glu Thr Gly Gln Tyr Leu Ala Met

195 200 205

gac acc gac ggg ctt tta tac ggc tca cag aca cca aat gag gaa tgt 672  
 Asp Thr Asp Gly Leu Leu Tyr Gly Ser Gln Thr Pro Asn Glu Glu Cys

210 215 220

ttg ttc ctg gaa agg ctg gag gag aac cat tac aac acc tat ata tcc 720  
 Leu Phe Leu Glu Arg Leu Glu Glu Asn His Tyr Asn Thr Tyr Ile Ser

225 230 235 240

aag aag cat gca gag aag aat tgg ttt gtt ggc ctc aag aag aat ggg 768  
 Lys Lys His Ala Glu Lys Asn Trp Phe Val Gly Leu Lys Lys Asn Gly

245 250 255

agc tgc aaa cgc ggt cct cgg act cac tat ggc cag aaa gca atc ttg 816  
 Ser Cys Lys Arg Gly Pro Arg Thr His Tyr Gly Gln Lys Ala Ile Leu

260 265 270

ttt ctc ccc ctg cca gtc tct tct gat 843  
 Phe Leu Pro Leu Pro Val Ser Ser Asp

275 280

<210> 25

<211> 172

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: fusion of

sequence for a part of mouse fibroblast growth factor 6 and  
a part of human fibroblast growth factor 1

<400> 25

Met Ser Arg Gly Ala Gly Arg Val Gln Gly Thr Leu Gln Ala Leu Val

1 5 10 15

Phe Leu Gly Val Leu Val Gly Met Val Val Pro Ser Pro Ala Gly Ala

20 25 30

Arg Ala Asn Gly Ser Ala Asn Tyr Lys Lys Pro Lys Leu Leu Tyr Cys

35 40 45

Ser Asn Gly Gly His Phe Leu Arg Ile Leu Pro Asp Gly Thr Val Asp

50 55 60

Gly Thr Arg Asp Arg Ser Asp Gln His Ile Gln Leu Gln Leu Ser Ala

65 70 75 80

Glu Ser Val Gly Glu Val Tyr Ile Lys Ser Thr Glu Thr Gly Gln Tyr

85 90 95

Leu Ala Met Asp Thr Asp Gly Leu Leu Tyr Gly Ser Gln Thr Pro Asn

100 105 110

Glu Glu Cys Leu Phe Leu Glu Arg Leu Glu Glu Asn His Tyr Asn Thr

115 120 125

Tyr Ile Ser Lys Lys His Ala Glu Lys Asn Trp Phe Val Gly Leu Lys  
 130 135 140

Lys Asn Gly Ser Cys Lys Arg Gly Pro Arg Thr His Tyr Gly Gln Lys  
 145 150 155 160

Ala Ile Leu Phe Leu Pro Leu Pro Val Ser Ser Asp  
 165 170

<210> 26

<211> 516

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: fusion of  
 sequence for a part of mouse fibroblast growth factor 6 and  
 a part of human fibroblast growth factor 1

<220>

<221> CDS

<222> (1)..(516)

<400> 26

atg tcc cgg gga gca gga cgt gtt cag ggc acg ctg cag gct ctc gtc 48  
 Met Ser Arg Gly Ala Gly Arg Val Gln Gly Thr Leu Gln Ala Leu Val  
 1 5 10 15

ttc tta ggc gtc cta gtg ggc atg gtg gtg ccc tca cct gcc ggc gcc 96



aag aat ggg agc tgc aaa cgc ggt cct cgg act cac tat ggc cag aaa 480  
 Lys Asn Gly Ser Cys Lys Arg Gly Pro Arg Thr His Tyr Gly Gln Lys  
 145 150 155 160

gca atc ttg ttt ctc ccc ctg cca gtc tct tct gat 516  
 Ala Ile Leu Phe Leu Pro Leu Pro Val Ser Ser Asp  
 165 170

<210> 27

<211> 210

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: fusion of  
 sequence for a part of mouse fibroblast growth factor 6 and  
 a part of human fibroblast growth 1

<400> 27

Met Ser Arg Gly Ala Gly Arg Val Gln Gly Thr Leu Gln Ala Leu Val  
 1 5 10 15

Phe Leu Gly Val Leu Val Gly Met Val Val Pro Ser Pro Ala Gly Ala  
 20 25 30

Arg Ala Asn ~~Gly~~ Thr Leu Leu Asp Ser Arg Gly Trp Gly Thr Leu Leu  
 35 40 45

Ser Arg Ser Arg Ala Gly Leu Ala Gly Glu Ile Ser Gly Val Asn Trp

50                      55                      60 *human* *FGF-1*  
 Glu Ser Gly Tyr Leu Val Gly Ile Lys Arg Gln Ala Asn Tyr Lys Lys  
 65                      70                      75                      80  
 Pro Lys Leu Leu Tyr Cys Ser Asn Gly Gly His Phe Leu Arg Ile Leu  
                                  85                      90                      95  
 Pro Asp Gly Thr Val Asp Gly Thr Arg Asp Arg Ser Asp Gln His Ile  
                                  100                      105                      110  
 Gln Leu Gln Leu Ser Ala Glu Ser Val Gly Glu Val Tyr Ile Lys Ser  
                                  115                      120                      125  
 Thr Glu Thr Gly Gln Tyr Leu Ala Met Asp Thr Asp Gly Leu Leu Tyr  
                                  130                      135                      140  
 Gly Ser Gln Thr Pro Asn Glu Glu Cys Leu Phe Leu Glu Arg Leu Glu  
 145                      150                      155                      160  
 Glu Asn His Tyr Asn Thr Tyr Ile Ser Lys Lys His Ala Glu Lys Asn  
                                  165                      170                      175  
 Trp Phe Val Gly Leu Lys Lys Asn Gly Ser Cys Lys Arg Gly Pro Arg  
                                  180                      185                      190  
 Thr His Tyr Gly Gln Lys Ala Ile Leu Phe Leu Pro Leu Pro Val Ser  
                                  195                      200                      205  
 Ser Asp  
 210

<210> 28

<211> 630

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: fusion of  
sequence for a part of mouse fibroblast growth factor 6 and  
a part of human fibroblast growth 1

<220>

<221> CDS

<222> (1)..(630)

<400> 28

atg tcc cgg gga gca gga cgt gtt cag ggc acg ctg cag gct ctc gtc 48

Met Ser Arg Gly Ala Gly Arg Val Gln Gly Thr Leu Gln Ala Leu Val

1 5 10 15

ttc tta ggc gtc cta gtg ggc atg gtg gtg ccc tca cct gcc ggc gcc 96

Phe Leu Gly Val Leu Val Gly Met Val Val Pro Ser Pro Ala Gly Ala

20 25 30

cgc gcc aac ggc acg cta ctg gac tcc aga ggc tgg ggc acc ctc ttg 144

Arg Ala Asn Gly Thr Leu Leu Asp Ser Arg Gly Trp Gly Thr Leu Leu

35 40 45

tcc agg tct cga gct ggg cta gct gga gag att tcg ggt gtg aat tgg 192



tgg ttt gtt ggc ctc aag aag aat ggg agc tgc aaa cgc ggt cct cgg 576  
 Trp Phe Val Gly Leu Lys Lys Asn Gly Ser Cys Lys Arg Gly Pro Arg

180 185 190

act cac tat ggc cag aaa gca atc ttg ttt ctc ccc ctg cca gtc tct 624  
 Thr His Tyr Gly Gln Lys Ala Ile Leu Phe Leu Pro Leu Pro Val Ser

195 200 205

tct gat 630

Ser Asp

210

<210> 29

<211> 180

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: fusion of

sequence for a part of mouse fibroblast growth factor 6,

a part of human fibroblast growth factor 1 and an artificial

sequence

<400> 29

Met Ser Arg Gly Ala Gly Arg Val Gln Gly Thr Leu Gln Ala Leu Val

1 5 10 15

Phe Leu Gly Val Leu Val Gly Met Val Val Pro Ser Pro Ala Gly Ala

20 25 30

human ~~FF~~ FF-1

Arg Ala Asn Gly Thr Leu Leu Asp Ala Asn Tyr Lys Lys Pro Lys Leu

35

40

45

Leu Tyr Cys Ser Asn Gly Gly His Phe Leu Arg Ile Leu Pro Asp Gly

50

55

60

Thr Val Asp Gly Thr Arg Asp Arg Ser Asp Gln His Ile Gln Leu Gln

65

70

75

80

Leu Ser Ala Glu Ser Val Gly Glu Val Tyr Ile Lys Ser Thr Glu Thr

85

90

95

Gly Gln Tyr Leu Ala Met Asp Thr Asp Gly Leu Leu Tyr Gly Ser Gln

100

105

110

Thr Pro Asn Glu Glu Cys Leu Phe Leu Glu Arg Leu Glu Glu Asn Ala

115

120

125

Thr Pro Ala Pro His Tyr Asn Thr Tyr Ile Ser Lys Lys His Ala Glu

130

135

140

Lys Asn Trp Phe Val Gly Leu Lys Lys Asn Gly Ser Cys Lys Arg Gly

145

150

155

160

Pro Arg Thr His Tyr Gly Gln Lys Ala Ile Leu Phe Leu Pro Leu Pro

165

170

175

Val Ser Ser Asp

180

<210> 30

<211> 540

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: fusion of

sequence for a part of mouse fibroblast growth factor 6,

a part of human fibroblast growth factor 1 and an artificial  
sequence

<220>

<221> CDS

<222> (1)..(540)

<400> 30

atg tcc cgg gga gca gga cgt gtt cag ggc acg ctg cag gct ctc gtc 48

Met Ser Arg Gly Ala Gly Arg Val Gln Gly Thr Leu Gln Ala Leu Val

1 5 10 15

ttc tta ggc gtc cta gtg ggc atg gtg gtg ccc tca cct gcc ggc gcc 96

Phe Leu Gly Val Leu Val Gly Met Val Val Pro Ser Pro Ala Gly Ala

20 25 30

cgc gcc aac ggc acg cta ctg gac gct aat tac aag aag ccc aaa ctc 144

Arg Ala Asn Gly Thr Leu Leu Asp Ala Asn Tyr Lys Lys Pro Lys Leu

35 40 45

ctc tac tgt agc aac ggg ggc cac ttc ctg agg atc ctt ccg gat ggc 192

Leu Tyr Cys Ser Asn Gly Gly His Phe Leu Arg Ile Leu Pro Asp Gly	
50 55 60	
aca gtg gat ggg aca agg gac agg agc gac cag cac att cag ctg cag	240
Thr Val Asp Gly Thr Arg Asp Arg Ser Asp Gln His Ile Gln Leu Gln	
65 70 75 80	
ctc agt gcg gaa agc gtg ggg gag gtg tat ata aag agt acc gag act	288
Leu Ser Ala Glu Ser Val Gly Glu Val Tyr Ile Lys Ser Thr Glu Thr	
85 90 95	
ggc cag tac ttg gcc atg gac acc gac ggg ctt tta tac ggc tca cag	336
Gly Gln Tyr Leu Ala Met Asp Thr Asp Gly Leu Leu Tyr Gly Ser Gln	
100 105 110	
aca cca aat gag gaa tgt ttg ttc ctg gaa agg ctg gag gag aac gct	384
Thr Pro Asn Glu Glu Cys Leu Phe Leu Glu Arg Leu Glu Glu Asn Ala	
115 120 125	
act cca gct cca cat tac aac acc tat ata tcc aag aag cat gca gag	432
Thr Pro Ala Pro His Tyr Asn Thr Tyr Ile Ser Lys Lys His Ala Glu	
130 135 140	
aag aat tgg ttt gtt ggc ctc aag aag aat ggg agc tgc aaa cgc ggt	480
Lys Asn Trp Phe Val Gly Leu Lys Lys Asn Gly Ser Cys Lys Arg Gly	
145 150 155 160	
cct cgg act cac tat ggc cag aaa gca atc ttg ttt ctc ccc ctg cca	528
Pro Arg Thr His Tyr Gly Gln Lys Ala Ile Leu Phe Leu Pro Leu Pro	
165 170 175	

gtc tct tct gat

540

Val Ser Ser Asp

180

<210> 31

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:primer for PCR

<400> 31

aacaaaagct gggtaccggg

20

*B' included*